



SMITHSONIAN INSTITUTION  
U. S. NATIONAL MUSEUM

Vol. 84

Washington : 1937

No. 3015

## MEXICAN FOSSIL ECHINI

By ROBERT TRACY JACKSON

*Museum of Comparative Zoology, Cambridge, Mass.*

THE collection of fossil Echini reported upon in this paper was submitted to me for study by Dr. T. Wayland Vaughan. All types of new species described herein are in the United States National Museum except that of *Lovenia mexicana*, which is in the museum of the California Academy of Sciences, San Francisco.

I should express my warm appreciation to my friend Dr. Hubert Lyman Clark for his help in this work. His opinion is of great value, especially in the cidaroids and clypeastroids, for the indentification in these two groups is exceptionally difficult on account of the multiplicity of species, and Dr. Clark is a high authority on both groups. Assistance in stating precisely the localities and the geologic horizons has been kindly rendered by J. M. Muir and Thomas F. Grimsdale.

The regular Echini are represented by only two species of *Cidaris* and one of *Stomopneustes*. This last is of exceptional interest, as it is the first recorded occurrence of the genus as found fossil in America. Indeed, its previous occurrence as a fossil anywhere is somewhat doubtful. The clypeastroids, as usual in Tertiary collections, are rather abundant in species and individuals. Of spatangoids there are a number of species, and the specimens are in an exceptionally good state of preservation.

Table 1 shows the localities and the geologic horizons of the species found in the collection.

TABLE 1.—Localities and geologic horizons of species of Mexican fossil Echini recorded in this paper

Species	Localities	Horizon
<i>Cidaris loeni</i> Cotteau.....	Túxpan City, Veracruz.....	Miocene, Túxpan formation
<i>thouarsii</i> Agassiz and Desor.....	do.....	Do.
<i>Stomopneustes pristinus</i> , new species.....	Hacienda Tierra Amarilla, about 7 km NW. of town of Temapache, Veracruz.	Oligocene, Mesón formation.
<i>Clypeaster meridanensis</i> Michelin....	{Hacienda Santa Fé, Topila Hills, Veracruz. Túxpan City, Veracruz.....	Do.
<i>marinanus</i> , new species.....	2.5 km SW. of Mesón Village; Topila; other localities.	Miocene, Túxpan formation
<i>topilanus</i> , new species.....	Hacienda Santa Fé, Topila.....	Oligocene, Mesón formation.
<i>Laganum leptum</i> , new species.....	8 km E. of town of Chinampa.....	Do.
<i>Scutella cazonesensis</i> Kew.....	La Cuesta, Soto la Marina River.....	Do.
<i>Agasszia clerei</i> Cotteau.....	Salitre Ranch.....	Not definitely known, Oligocene or Miocene.
<i>Schizaster cristatus</i> Jackson.....	8 km E. of town of Chinampa and other localities.	Oligocene, Mesón formation.
<i>Eupatagus mexicanus</i> , new species....	Hacienda Santa Fé, Topila.....	Do.
<i>Loenia dumblei</i> Kew.....	10 km E. of town of Chinampa.....	Do.
<i>mexicana</i> , new species.....	2.5 km SW. of Mesón Village.....	Do.

Dickerson and Kew have published a paper<sup>1</sup> in which Kew, who is the author of the echinoid portion, recognized 12 species of Echini, four of which were described as new. Merle C. Israelsky<sup>2</sup> described six new species of Echini from Mexico and recorded in all 13 species from that region. Errors in localities as cited by Israelsky are corrected in a book by J. M. Muir.<sup>3</sup> Additional fossil Echini from Mexico are included in a paper by the veteran echinologist M. Jules Lambert,<sup>4</sup> who had only a limited amount of material, some 12 specimens, which he referred to eight species, three of which were described as new.

In the material on which the present paper is based 13 species are recorded, six of which are new. In all, 32 species have been recorded from Mexico, 18 of which were described as new.

<sup>1</sup> The fauna of a medial Tertiary formation and the associated horizons of northeastern Mexico. Proc. California Acad. Sci., ser. 4, vol. 7, no. 5, pp. 125-156, pls. 17-26a, 1917.

<sup>2</sup> Notes on some echinoids from the San Rafael and Túxpan beds of the Tampico region, Mexico. Proc. California Acad. Sci., ser. 4, vol. 13, no. 8, pp. 137-145, pls. 2-4, 1924.

<sup>3</sup> Geology of the Tampico embayment, xix+280 pp., illus. American Association of Petroleum Geologists, 1936.

<sup>4</sup> Note sur quelques Echinides recueillis par Mr. Walter Staub dans le Néogène de l'Est du Mexique. Eclog. geol. Helv., vol. 21, no. 1, pp. 272-283, 6 figs., 1 pl., 1928.

## Order CIDAROIDA Duncan

## Family CIDARIDAE Gray

## Genus CIDARIS Leske

## CIDARIS LOVENI Cotteau

*Cidaris loveni* COTTEAU, Kongl. Svenska Vet.-Akad. Handl., vol. 13, no. 6, p. 10, pl. 1, figs. 11-14, 1875.—JACKSON, Carnegie Inst. Washington Publ. 306, p. 19, pl. 1, figs. 8-10, 1922.

A fragment consisting of an interambulacral area and a half-ambulacral area appears referable to this species, although it is considerably larger than the type, which is from the Eocene of St. Bartholomew, West Indies. The Mexican specimen measures 29 mm in height, width of the interambulacrum at the midzone 22 mm, width of the half-ambulacrum at the same zone 3 mm. This, of course, indicates 6 mm as the width of the ambulacral area. This species is recorded qualifiedly as *Cidaris* cf. *loveni* by Kew and also by Israelsky as from Tuxpan, based apparently on the same specimen here considered.

Miocene, Tuxpan formation, Tuxpan, Veracruz, Mexico; Dumble and Cummins, collectors, 1908, California Academy of Sciences, locality X 14, one specimen.

## CIDARIS THOUARSII Agassiz and Desor

*Cidaris thouarsii* AGASSIZ and DESOR, Catalogue Raisonné, Ann. Sci. Nat., ser. 3, vol. 6, p. 326, 1846.

A specimen somewhat crushed but otherwise fairly well preserved is referred to this species. It measures 17 mm in height, width of an ambulacrum at the midzone about 3 mm, width of an interambulacrum at the same zone 14 mm. *Cidaris thouarsii* occurs in the Recent fauna of the Pacific off the west coast of Mexico. It is of interest that it is found also in the fossil state in Mexico. *C. tribuloides*, which is abundant in the Recent West Indian fauna, has been found fossil in Cuba.

Miocene, Tuxpan formation, Tuxpan, Veracruz, Mexico; Dumble and Cummins, collectors, 1908, California Academy of Sciences, locality X 14, one specimen.

## Order CENTRECHINOIDA Jackson

## Suborder STIRODONTA Jackson

## Family STOMOPNEUSTIDAE Mortensen

## Genus STOMOPNEUSTES Agassiz

## STOMOPNEUSTES PRISTINUS, new species

## PLATE 12, FIGURE 1

Test low, dome-shaped, ambitus below the midzone, slightly pentagonal in horizontal outline, the ambulacral areas coinciding with

the apices of the pentagon, flattened dorsally, slightly reëntrant about the peristome, otherwise very nearly flat ventrally. Ambulacra wide, measuring about 25 mm in width at the ambitus, ambulacral plates composed of three elements, but this species, like the Recent *S. variolaris* (Lamarck), has a peculiar arrangement in that every fourth ambulacral plate bears a large primary tubercle that has grown over four plates and hides their sutures. This, with other important details in regard to the Recent species, is considered by Dr. H. L. Clark.<sup>5</sup> Interambulacra with two vertical rows of primary tubercles in each half-area. Diameter of the specimen 81 mm, height 38 mm.

The single known specimen (U.S.N.M. no. 496275) of this new and interesting echinoid is much worn and shows structural detail only in parts of the test. The peristome and periproct are not preserved, or are not visible. The test is thick and solid and gives no evidence of flattening or other distortion.

The genus *Stomopneustes* is known from the Recent species *S. variolaris* (Lamarck) from the southern Pacific Ocean. According to Duncan,<sup>6</sup> a species has been found in the Tertiary of Java, but he queried the statement.

Oligocene, Mesón, Hacienda Tierra Amarilla, about 7 km northwest of the town of Temapache, Canton Tuxpan, Veracruz, Mexico; Corona collection, no. 29 (=H176), one specimen.

## Order EXOCYCLOIDA Jackson

### Suborder CLYPEASTRINA Gregory

#### Family CLYPEASTRIDAE Agassiz

##### Genus CLYPEASTER Lamarck

##### CLYPEASTER MERIDANENSIS Michelin

*Clypeaster meridanensis* MICHELIN, Rév. et Mag. Zool., ser. 2, vol. 2, p. 240, 1850; Mém. Soc. Geol. France, ser. 2, vol. 7, p. 136, pl. 14, figs. 1a-f, 1861.

Of the species *Clypeaster meridanensis*, described by Michelin from the Tertiary of Merida, Yucatan, there is a fine series of extremely well preserved specimens from Tuxpan, Tampico, and Hacienda Santa Fé, Topila, Mexico. The largest specimen, from a small quarry in the town of Tuxpan, collected by D. R. Semmes, no. 82, measures 160 mm in length, 142 mm in width at the widest part through ambulacra II and IV, and 27 mm in height.

There are 12 specimens of this species from the Miocene of Tuxpan, Veracruz, Mexico, and two from the Oligocene Mesón formation of Hacienda Santa Fé, Topila, Veracruz. Also there is a 4-rayed specimen and a fragment from 1 mile north of Tampico and on the opposite

<sup>5</sup> Mem. Mus. Comp. Zool., vol. 34, no. 2, 1912.

<sup>6</sup> Revision of the genera and great groups of the Echinoidea. Journ. Linn. Soc. London, Zool., vol. 23, pp. 1-311, 1889.

side of Laguna del Carpintero from it; California Academy of Sciences, locality X 34. A specimen with petals broader and poriferous areas wider than is usual in the species as a variant is from Tuxpan, Veracruz, California Academy of Sciences, locality X 14.

Lambert <sup>7</sup> also records this species from Tuxpan.

CLYPEASTER MARINANUS, new species

PLATE 12, FIGURE 2; PLATE 13, FIGURE 1

Test elongate, low, subpentagonal in outline, very thin on the borders, center only slightly elevated, ventrally nearly flat, slightly reëntrant around the mouth. Ambulacral petals relatively short, slightly curved, open at the tips, nearly flush with the surface of the test, poriferous areas not sunken. Apical disk slightly anterior to the center. Periproct near the posterior end; in a specimen 72 mm long the periproct is 6 mm from the border. Tubercles are small dorsally and closely associated; ventrally they are larger and more deeply sunken.

There is a rather large series of specimens of this species from several localities. The specimen selected as the type, H 120 (U.S.N.M. no. 496276), from Chamal on the north side of Soto la Marina River, measures 102 mm in length, 94 mm in width, and about 20 mm in height. Another specimen, from Hacienda Santa Fé, Topila, measures 116 mm in length, 98 mm in width, and about 17 mm in height.

*Clypeaster marinanus* approaches in character nearest to *C. rogersi* Morton but differs from that in having the test flatter and being much thinner at the margin and less deeply reëntrant around the mouth. Also the ambulacral petals are shorter, narrower, and less curved, and the poriferous areas are narrower in *rogersi*. *C. marinanus* differs from *C. staudi* Lambert, which also occurs east of Soto la Marina, in that the test of *marinanus* is much less conically elevated and much less pentagonal in outline than *staudi*.

Oligocene, Mesón formation, at the following localities: Chamal, Soto la Marina River, Tamaulipas, Mexico, Corona collection, six specimens including the holotype; Mesón, Hacienda Santa Fé, Topila, Veracruz, six specimens; Lot 214 Hacienda Chinampa, 10 km east of town of Chinampa, Canton Tuxpan, Veracruz, just above the main *Lepidocyclina gigas* beds, top of Mesón formation, three small immature specimens; east of Ozuluama, one specimen; Mesón formation, Aguila Colony, about 4 km northwest of the cathedral, Tampico, Mexico, one specimen; north of Arbol Grande, between 3,700 and 4,300 feet north of Arbol Grande station, near Tampico, Mexico, several fragments; cut on street railway between Dona Cecilia and Tampico, Mexico, one fragment, California Academy of Sciences, locality X 118.

<sup>7</sup> *Op. cit.*, p. 272.

## CLYPEASTER TOPILANUS, new species

## PLATE 13, FIGURES 2, 3

*Clypeaster* sp. *a* Kew, Proc. California Acad. Sci., ser. 4, vol. 7, no. 5, table facing p. 128 (for localities listed), pp. 130, 131, pl. 23, fig. 2; pl. 24, fig. 2, 1917.

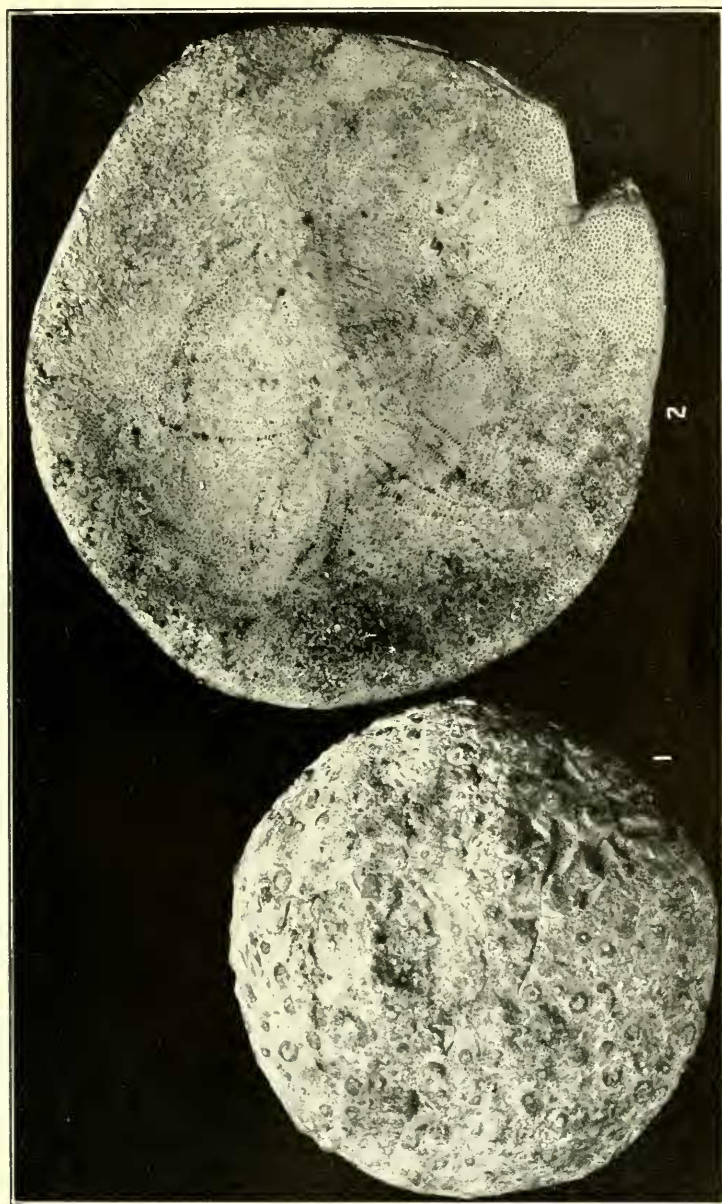
*Clypeaster* sp. ISRAELSKY, Proc. California Acad. Sci., ser. 4, vol. 13, no. 8, p. 140, 1924.

Test moderately high, pentagonal, elongate anteriorly, truncate posteriorly, with thick rounded margin, dorsally elevated into a low dome, ventrally reëntrant to the moderately sunken peristome. Apical disk small, a little anterior to the center of the test. Periproct near the posterior border of the test, 5 mm from it in the type, which measures 96 mm in length. Ambulacral petals open at the tips, poriferous areas narrow, moderately depressed, nonporiferous areas only moderately elevated.

There is a rather large number of specimens of this species. The one selected as the type (U.S.N.M. no. 496278) measures 96 mm in length, 80 mm in width, and 25 mm in height. With all the species assigned to the genus *Clypeaster*, it is annoying to make still another, but these specimens cannot be made to fit into any species known. *C. topilanus* is nearest to *C. planipetalus* Cotteau, but it differs from that in having shorter petals and being less open at the tips; also the petals are straighter and the poriferous areas are narrower than they are in *planipetalus*. *C. topilanus* is more massive and more strongly pentagonal in outline than *C. sanrafaelensis* Israelsky, which is from the Tampico region.

The species that Kew figured as *Clypeaster* species *a* is evidently the same as that described here as new. Kew did not give any description of his species *a*, but it is listed in his table of species from the "San Fernando formation and associated beds." As noted on page 125 (footnote) of Dickerson and Kew's paper, the name "San Fernando" being preoccupied, the name "San Rafael" was proposed as a substitute by Prof. E. T. Dumble. That name has now been dropped, as it was a synonym of the Mesón formation. Kew gave as localities for his species *a*: Salitre Ranch, Tamaulipas; and hill at extreme north of La Puerta Range, Hacienda Santa Fé, Topila, Veracruz.

In the material at hand there is a fine series from the Mesón formation at abandoned Corona camp, Hacienda Santa Fé, Topila, Veracruz, Mexico, 16 specimens. One specimen without locality is marked locality X 83a, California Academy of Sciences.



1, *Stomopneustes pristinus*, new species, Oligocene, Mesón formation, Hacienda Tierra Amarilla, Mexico, Corona collection no. 29, holotype, dorsal view, U.S.N.M. no. 496275; 2, *Clypeaster maritimus*, new species, Mesón formation, Chamal on north side of Soto la Marina River, Corona collection no. H120, holotype, dorsal view, U.S.N.M. no. 496276. (Five-sixths natural size.)



1, *Clypeaster marinanns*, new species, Mesón formation, Hacienda Santa Fé, Topila, Mexico, locality M19V, paratype, ventral view, U.S.N.M. no. 496277; 2, *C. topilanus*, new species, same formation and locality, holotype, dorsal view, U.S.N.M. no. 496278; 3, *C. topilanus*, same formation and locality, Corona collection no. 14, paratype, ventral view, U.S.N.M. no. 496279; 4, *Laganum leptum*, new species, Mesón formation, on line of Transcontinental Railroad, lot 145, Hacienda Chinampa, 8 km east of town of Chinampa, Canton Tuxpan, Veracruz, at the first cut examined November 28, 1920, holotype, dorsal view, U.S.N.M. no. 496280. (Five-sixths natural size.)





*Eupatagus mexicanus*, new species, Mesón formation, Hacienda Santa Fé, Topila, Mexico, Corona collection no. 1, holotype, dorsal view, U.S.N.M. no. 496281. The figure is slightly foreshortened. (Five-sixths natural size.)



1, *Eupatagus mexicanus*, new species, Mesón formation, Hacienda Santa Fé, Topila, Mexico, Corona collection no. 1, holotype, ventral view of same specimen as pl. 14; 2, *Loxocia mexicana*, new species, Rancho Nuevo, 2.5 km W SW. of Meson, Canton Taxpan, Veracruz, W. F. Cummins collector, Calif. Acad. Sci., locality X62, holotype, dorsal view; 3, *L. mexicana*, same locality and collector, paratype, ventral view of a larger specimen than fig. 2. (Five-sixths natural size.)

## Family LAGANIDAE Desor

## Genus LAGANUM Gray

## LAGANUM LEPTUM, new species

## PLATE 13, FIGURE 4

Test very nearly circular, very flat and thin. Apical disk central, peristome probably the same, but invisible. Ambulacral petals short, wide, obovate. Poriferous areas wide. Periproct very near to, being only 2 mm from, the posterior border of the test.

The single known specimen (U.S.N.M. no. 496280) measures 38 mm in length, 35 mm in width, and about 5 mm in height. This species approaches perhaps nearest to *Laganum johnsoni* Twitchell, from the Eocene of Alabama. It differs from *johnsoni* in the extreme thinness of the test and in the shortness and obovate form of the petals in *leptum*.

*L. leptum* was collected by Dr. T. W. Vaughan in the Oligocene Mesón formation on the line of the Transcontinental Railroad, lot 145, Hacienda Chinampa, 8 km east of the town of Chinampa, Canton Tuxpan, Veracruz, Mexico, at the first cut examined, November 28, 1920.

## Family SCUTELLIDAE Agassiz

## Genus SCUTELLA Lamarck

## SCUTELLA CAZONESSENSIS Kew

*Scutella cazonesensis* KEW, Proc. California Acad. Sci., ser. 4, vol. 7, p. 132, pl. 19, fig. 1, 1917.

This species is represented by a fragmentary but very well preserved specimen of an individual almost exactly the same size as the one figured by Kew.

The specimen here considered is from La Cuesta, Soto la Marina River, Corona collection, no. 28. The geologic horizon is not definitely known, but is either upper Mesón or Tuxpan.

## Suborder SPATANGINA Jackson

## Family HEMIASTERIDAE H. L. Clark

## Genus AGASSIZIA Valenciennes

## AGASSIZIA CLEVEI Cotteau

*Agassizia clevei* COTTEAU (pars), Kongl. Svenska Vet.-Akad. Handl., vol. 13, no. 6, p. 33, pl. 6, figs. 2-8, 1875.—JACKSON, Carnegie Inst. Washington Publ. 306, p. 71, pl. 12, figs. 5-7, 1922.

Not *Agassizia clevei* KEW, Proc. California Acad. Sci., ser. 4, vol. 7, pl. 17, figs. 1a, 1b, 1917.

Two specimens are referred to this species. The larger of the two as a variant shows considerable resemblance to *A. inflata* Jackson.